ANNALS OF THE NEW YORK ACADEMY OF SCIENCES

Volume 511
December 15, 1987

NORMAL AND NEOPLASTIC BLOOD CELLS: FROM GENES TO THERAPY[a]

Editor and Chairman
CESARE PESCHLE

Honorary Chairmen
F. POCCHIARI and S. TURA

Scientific Committee
S. A. AARONSON, C. M. CROCE, R. C. GALLO, F. GAVOSTO, D. GOLDE, T. GRAF, H. KOPROWSKI, F. MANDELLI, P. MARKS, D. METCALF, A. W. NIENHUIS, G. B. ROSSI, and D. J. WEATHERALL

Scientific Secretariat and Organizing Committee
M. BUSCIOLANO, G. MASTROBERARDINO, F. MAVILIO, and G. SALVO

CONTENTS

Part I. Stem Cells and Hemopoietins

The Role of Growth Factors in Normal and Neoplastic Haemopoiesis. *By* ASHLEY R. DUNN 1

Hematopoietic Growth Factors as Therapeutic Agents. *By* ROBERT E. DONAHUE, STEVEN C. CLARK, and ROBERT KAMEN 10

Efficacy of Recombinant Human Granulocyte-macrophage Colony-stimulating Factor in Rhesus Monkeys. *By* P. MAYER, C. LAM, H. OBENAUS, E. LIEHL, and J. BESEMER 17

Tumor-derived Growth Factors That Support Proliferation and Differentiation of Normal and Leukemic Hemopoietic Cells. *By* DAVID J. TWEARDY, DANIELE CARACCIOLO, MAURO VALTIERI, and GIOVANNI ROVERA 30

Early Hemopoietic Differentiation: The Action of Multi-CSF Is Complemented by Lineage Specific Growth Factors. *By* GIOVANNI MIGLIACCIO and ANNA RITA MIGLIACCIO 39

Molecular Cloning and Production in Microorganisms of Hemopoietic Growth Factors. *By* JOHN F. DELAMARTER, JEAN-JACQUES MERMOD, MERRIE-JO JOHNSON, GARY N. BUELL, ALAN SHAW, and NICHOLAS M. GOUGH 50

[a]The papers in this volume were presented at an international symposium entitled Normal and Neoplastic Blood Cells: From Genes to Therapy sponsored by the Menarini Foundation, the Istituto Superiore di Sanità, and the World Health Organization and held at the Istituto Superiore di Sanità in Rome on June 10–13, 1986.

Interaction of Fibroblasts, Hemopoietic Cells and Platelets with Extracellular Matrix: Characterization and Role of a Common Cell Surface Glycoprotein. *By* FILIPPO G. GIANCOTTI, PAOLO M. COMOGLIO, and GUIDO TARONE 65

Part II. Genes, Development, and Differentiation

Hemopoietic Cell Progenitors in the Avian Embryo: Origin and Migrations. *By* F. DIETERLEN-LIÈVRE 77

The Murine Homeo Domain Protein Hox 1.1. *By* MICHAEL KESSEL, UWE DRESCHER, and PETER GRUSS 88

Human Ontogenic Development: Studies on the Hemopoietic System and the Expression of Homeo Box Genes. *By* C. PESCHLE 101

Proto-oncogene *fos:* Factors Affecting Expression and Covalent Modification of the Gene Product. *By* J. R. BARBER, P. SASSONE-CORSI, and I. M. VERMA. 117

Expression of Transferrin Receptors: Differential Regulatory Mechanisms in Monocytes-macrophages versus Other Hemopoietic Cells. *By* U. TESTA, A. CAMAGNA, G. GIANNELLA, E. PELOSI-TESTA, M. PETRINI, P. SAMOGGIA, E. MONTESORO, L. BOTTERO, N. M. SPOSI, G. SALVO, F. MAVILIO, G. ISACCHI, G. MASTROBERARDINO, and C. PESCHLE 131

Expression and *In-vitro* Modulation of HLA Antigens in Ontogenic Development of Human Hemopoietic System. *By* M. GABBIANELLI, G. BOCCOLI, S. PETTI, L. CIANETTI, R. LA VALLE, D. FERBUS, G. MASTROBERARDINO, U. TESTA, and C. PESCHLE 138

Part III. Molecular Basis of Neoplasia

Interactions of Retroviral and Cellular Transforming Genes with Hematopoietic Cells. *By* ALESSANDRA EVA, JACALYN H. PIERCE, and STUART A. AARONSON 148

The *ets* Genes in Cells and Viruses: Implications for Leukemias and Other Human Diseases. *By* TAKIS S. PAPAS, NARAYAN K. BHAT, THOMAS T. CHEN, GARRETT DUBOIS, ROBERT J. FISHER, SHIGEYOSHI FUJIWARA, LOUIS J. PRIBYL, NICOLETTA SACCHI, ARUN SETH, STEPHEN D. SHOWALTER, DENNIS K. WATSON, MARTIN ZWEIG, and RICHARD ASCIONE 171

The Growth Factor Module of Urokinase Is the Binding Sequence for Its Receptor. *By* E. APPELLA and F. BLASI 192

Molecular Mechanisms of Chromosome Translocation in Human B- and T-cell Neoplasia. *By* FRANK G. HALUSKA and CARLO M. CROCE 196

Mechanism of Activation and Biological Role of the *c-myc* Oncogene in B-cell Lymphomagenesis. *By* RICCARDO DALLA-FAVERA, LUIGIA LOMBARDI, PIER GIUSEPPE PELICCI, LUISA LANFRANCONE, ETHEL CESARMAN, and ANTONINO NERI 207

Mechanism of Activation of the *myb* Oncogene in Myeloid Leukemias. *By* DAN ROSSON and E. PREMKUMAR REDDY 219

Arrangements and Rearrangements of the Human T-cell Receptor Gamma Gene. *By* PIER GIUSEPPE PELICCI, ANTONINO NERI, DANIEL M. KNOWLES II, DAN R. LITTMAN, RICCARDO DALLA-FAVERA, and MILAYNA SUBAR.... 232

Induction of Transformed Cells to Terminal Differentiation. *By* PAUL A. MARKS, MICHAEL SHEFFERY, ROBERT RAMSAY, KAZUMA IKEDA, and RICHARD A. RIFKIND 246

Protein Tyrosine Kinases Associated with Human Malignancies. *By* PAOLO M. COMOGLIO, MARIA FLAVIA DI RENZO, and GIOVANNI GAUDINO 256

The Role of the Philadelphia Translocation in Chronic Myelocytic Leukemia. *By* G. GROSVELD, A. HERMANS, A. DE KLEIN, D. BOOTSMA, N. HEISTERKAMP, and J. GROFFEN 262

Significance of the Philadelphia Chromosome in Acute Leukemias: Variable Correlation with Rearrangements Involving the c-Abl and Bcr Genes. *By* GIUSEPPE SAGLIO, LUIGI PEGORARO, GIAN CARLO AVANZI, BRUNA GIOVINAZZO, FRANCO LOCATELLI, MICHELE FALDA, ANGELA TASSINARI, ALFONSO ZACCARIA, VINCENZA ATTADIA, GIOVANNA REGE CAMBRIN, ANGELO GUERRASIO, ANNA SERRA, and FELICE GAVOSTO 270

Expression of c-fos in Human Normal and Neoplastic Monocyte-Macrophage Differentiation. *By* N. M. SPOSI, M. PETRINI, F. MAVILIO, U. TESTA, L. BOTTERO, E. PELOSI, G. MASTROBERARDINO, S. AMADORI, F. MANDELLI, and C. PESCHLE 277

Comparison of Oncogene Expression in Human Normal Bone Marrow and Leukemia. *By* MARY JEAN EVINGER-HODGES, MARK BLICK, JOEL BRESSER, and KAREL A. DICKE 284

Regulation of the Expression of Class II Genes of the Human Major Histocompatibility Complex in Tumor Cells. *By* ROBERTO GAMBARI, RAFAELLA BARBIERI, ROBERTA PIVA, RAFFAELE TECCE, PAUL B. FISHER, PATRIZIO GIACOMINI, and PIER GIORGIO NATALI 292

Isolation of Molecular Hybridisation Probes for Early Myeloid Lineage RNAs. *By* K. I. MILLS, V. A. ANDERSON, and G. D. BIRNIE 308

The E12 Rat Fibroblasts Line: Differential Effects of Growth Factors (EGF, PDGF, FGF, TPA and TGFβ) on Cell Proliferation and c-fos Expression. *By* ELIO LIBOI, ELVIRA PELOSI, PAOLO DI FRANCESCO, PAOLA GALLINARI, MARINA PETRINI, NADIA MARIA SPOSI, UGO TESTA, GIOVANNI BATTISTA ROSSI, and CESARE PESCHLE 318

c-myc Gene Effects on Cell Growth and Transformation. *By* VINCENZO SORRENTINO, VLADIMIR DROZDOFF, LOUIS ZEITZ, and ERWIN FLEISSNER . 329

A Novel Type of c-myc Translocation in a T Lymphoma Cell Line. *By* DEBORAH AGHIB, SERGIO OTTOLENGHI, MARIANO ROCCHI, ANGELO GUERRASIO, and GIUSEPPE SAGLIO 338

Tumor Promoters Enhance v-myc-induced Focus Formation in Mammalian Cell Lines. *By* MARGHERITA BIGNAMI, SILVIA ROSA, SERVERINA ANNA LA ROCCA, GERMANA FALCONE, and FRANCO TATÒ 343

Part IV. Human Retroviruses, Lymphoid Malignancies and AIDS

Human Retroviruses: HTLV-I, II, and III and Their Association with Leukemia and AIDS. *By* CORRADO GURGO and ROBERT C. GALLO 350

The Origins of HIV-1 and HTLV-4/HIV-2. *By* P. J. KANKI, J. R. HOPPER, and M. ESSEX 370

Genetic Variability in Human Immunodeficiency Viruses. *By* MARC ALIZON and LUC MONTAGNIER 376

Studies on Cell-mediated Immune Defects to Epstein-Barr Virus and Cytomegalovirus in HIV-related Disorders. *By* MARIA CATERINA SIRIANNI, GIUSEPPE RAGONA, SILVIA SODDU, LAURA CUOMO, and FERNANDO AIUTI 385

Recovery of HIV-related Retroviruses from Italian Patients with AIDS of AIDS-related Complex and from Asymptomatic At-Risk Individuals. *By* GIOVANNI B. ROSSI, PAOLA VERANI, BEATRICE MACCHI, MAURIZIO FEDERICO, ANGELA ORECCHIA, LOREDANA NICOLETTI, STEFANO BUTTÒ, ADRIANO LAZZARIN, GUGLIELMO MARIANI, GIUSEPPE IPPOLITO, and VITTORIO MANZARI 390

Human T-lymphotropic Retrovirus Infection in Italy. *By* V. MANZARI, G. BARILLARI, L. ALBONICI, D. FRENCH, L. DE MARCHIS, and L. FRATI 401

Part V. New Therapeutical Approaches

Retroviral Vector-mediated Gene Transfer and Expression in Nonhuman Primates following Autologous Bone Marrow Transplantation. *By* A. GILLIO, C. BORDIGNON, N. KERNAN, P. KANTOFF, M. EGLITIS, J. MCLACHLIN, E. KARSON, S. F. YU, J. ZWIEBEL, A. NIENHUIS, S. KARLSSON, M. BLAESE, D. KOHN, D. ARMENTANO, E. GILBOA, W. F. ANDERSON, and R. J. O'REILLY 406

Efficient Introduction of Transient Expression of Exogenous Genes in Human Hemopoietic Cells. *By* ARIELLA OPPENHEIM, AVIVA PELEG, and ELIEZER A. RACHMILEWITZ 418

Hyperthermia Potentiates the Activity of Immunotoxin Conjugates against Common Acute Lymphoblastic Leukemia Cells *in Vitro*. *By* R. P. HERRMANN, J. M. PELHAM, C. L. RAPHAEL, B. F. MEYER, and R. E. DAVIS 428

Sequential Pilot Studies of Intensive Postremission Chemotherapy for Acute Nonlymphocytic Leukemia. *By* M. C. PETTI, G. AVVISATI, A. TAFURI, G. MELONI, S. AMADORI, and F. MANDELLI 436

The Role of Residual Host Immunity in Graft Failures following T-cell-depleted Marrow Transplants for Leukemia. *By* C. BORDIGNON, N. A. KERNAN, C. A. KEEVER, E. BENAZZI, T. N. SMALL, J. BROCHSTEIN, I. CUNNINGHAM, N. H. COLLINS, D. EMANUEL, J. LAVER, H. CASTRO-MALASPINA, N. FLOMENBERG, S. GULATI, J. BURNS, B. SHANK, B. DUPONT, and R. J. O'REILLY 442

Bone Marrow Transplantation: Its Biology and Role as Treatment for Acute and Chronic Leukemias. *By* RICHARD CHAMPLIN and ROBERT PETER GALE 447

Clinical Problems Associated with T Cell Depletion for Bone Marrow Transplantation. *By* A. BACIGALUPO, M. T. VAN LINT, F. FRASSONI, D. OCCHINI, P. A. PITTALUGA, G. PIAGGIO, O. FIGARI, and A. M. MARMONT. 459

Bone Marrow Transplantation in Thalassemia after Busulphan and Cyclophosphamide: Report on 88 Cases. *By* M. GALIMBERTI, P. POLCHI, G. LUCARELLI, C. DELFINI, P. POLITI, C. GIARDINI, D. BARONCIANI, and F. MANENTI 464

The Role of Autologous Bone Marrow Transplantation in Acute Leukemia. *By* KAREL A. DICKE, SUNDAR JAGANNATH, RONALD S. WALTERS, LEONARD J. HORWITZ, and GARY SPITZER 468

High Sensitivity and Specificity Assay for Detection of Leukemia/Lymphoma Cells in Human Bone Marrow. *By* MARCO BREGNI, SALVATORE SIENA, RICCARDO DALLA-FAVERA, and ALESSANDRO M. GIANNI 473

Autologous Bone Marrow Transplantation for Patients with Acute Myelogenous Leukemia in Complete Remission. *By* G. MELONI, P. DE FABRITIIS, M. C. PETTI, A. PULSONI, A. SANDRELLI, A. COVELLI, F. SIMONE, and F. MANDELLI 483

Index of Contributors 489

The New York Academy of Sciences believes it has a responsibility to provide an open forum for discussion of scientific questions. The positions taken by the participants in the reported conferences are their own and not necessarily those of the Academy. The Academy has no intent to influence legislation by providing such forums.